

REMARKS

1. The Patent Office Action of July 24, 2006 is hereby acknowledged. The shortened statutory period of three (3) months time period for response to the Office Action expired on October 24, 2006. This Amendment after Office Action is being mailed by United States Express Mail, Express Mail Label No. EV 943968096 US in a postage paid envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on December 19, 2006. Concurrently with the filing of this Amendment, the Applicants have requested a two-month extension of time and have paid the required fee. Accordingly, the deadline to now file this Amendment is December 24, 2006. Therefore, this Amendment is timely filed. In the event that the Commissioner for Patents should determine that any additional fee is required for this Amendment to be timely filed and an appropriate fee is due for that extension of time, then the Commissioner for Patents is hereby authorized to charge Deposit Account Number 18-2222 for such appropriate fee.

2. The original '766 Application had nine (9) total claims wherein one (1) was an independent claim. Four new dependent Claims 10, 11, 12 and 13 have been added through the current Amendment. Therefore, the application now has a total of 13 claims wherein one is an independent claim. Therefore, no additional filing fee is due. In the event that the Commissioner for Patents should determine that any additional fee is due, then the Commissioner for Patents is hereby authorized to charge Deposit Account Number 18-2222 for the appropriate fee.

3. The Examiner has rejected Claims 5, 8 and 9 as being indefinite under 35 U.S.C. § 112. The Applicants appreciate the Examiner's comments, and have amended Claims 5, 8 and 9 as follows to meet the requirement of 35 U.S.C. § 112:

Claim "5. Said modulus ceramic particles in accordance with Claim 4, wherein said

1 particles are selected from boron carbide powder, silicon carbide powder or other ceramic  
2 powders having higher elastic modulus than that of aluminum oxide”.

3  
4 Claim “8. Said nano-scale aluminum oxide particles in accordance of Claim 3,  
5 wherein said particles have an average particle size between about 10 nm to about 800 nm”.

6  
7 Claim “9. Said modulus ceramic particles in accordance with Claim 4, wherein said  
8 particles have an average particle size between about 0.2 micros to about 15 microns”.

9  
10 4. The Examiner has rejected each of all nine pending claims of the ‘766  
11 Application in the First Office Action dated July 24, 2006 for the following reasons:

12  
13 i) Claims 1-5, and 7-9 under 35 U.S.C. § 102(e) as being anticipated by  
14 United States Patent 6,630,008 to Meeks, III et al. for “NANOCRYSTALLINE  
15 ALUMINUM MATERIAL MATRIX COMPOSITES, AND PRODUCTION METHOD”  
16 (hereafter “Meeks”);

17 ii) Claims 1-5, and 7-8 under 35 U.S.C. § 102(e) as being anticipated by  
18 United States Patent 5,561,829 to Sawtell et al. for “METHOD OF PRODUCING  
19 STRUCTURAL MATERIAL MATRIX COMPOSITE PRODUCTS FROM A BLEND OF  
20 POWDERS” (hereafter “Sawtell”);

21 iii) Claim 6 under 35 U.S.C. § 103(a) as being obvious based on United  
22 States Patent 3,816,080 to Bomford et al. for “MECHANICALLY-ALLOYED  
23 ALUMINUM-ALUMINUM OXIDE” combined with the Sawtell and Meeks References;  
24 and

25 iv) Claim 9 under 35 U.S.C. § 103(a) as being obvious based on the  
26 combination of the Sawtell Reference combined with the Meek Reference.

27 The Applicants very respectfully disagree with the Patent Examiner because  
28 the ‘766 Application is structurally different from the Meeks, Sawtell and Bomford

References. However, in order to further enhance the patentability of the '766 Application, the Applicants have further amended the independent Claim 1 to make it further distinguishable over the cited references. The amended claims will be presented in Section 5 of this Amendment. The Applicants also will introduce the court findings on interpreting the term "anticipation" under 35 U.S.C. § 102 and obviousness under 35 U.S.C. § 103. Using the court findings as the guidelines, the Applicants will discuss why the '766 Application is patentable. Such discussion will be presented in Section 6.

5. Amended claim and newly added claims

5.1 Amendment to the independent Claim 1:

"A nanocomposite which is manufactured from applying particles of materials, comprising:

- a. aluminum or aluminum alloy particles with nano-scale surface aluminum oxide composed of an aluminum metal or aluminum alloy inside of said particles and an aluminum oxide layer on the outside of said particles, and particles of a modulus phase, and
- b. said aluminum oxide layer of the particles is quantitatively controlled from a volume percent of nano phase aluminum oxide needed in said particles which is defined by the symbol  $N_{Al}$ , and is specified by:  
$$N_{Al} = N_T (1 + V_M/V_{Al})$$
where  $N_T$  is a volume percent of the nano phase aluminum oxide in the nanocomposite,  $V_M$  is a total volume percent of the modulus phase, and  $V_{Al}$  is a total volume percent of the aluminum phase in the nanocomposite".

The Applicants believe that such amendment of Claim 1 is allowable since the amendment follows the disclosure of the '766 Application.

In the Section entitled "DETAILED DESCRIPTION OF PREFERRED

In the Section entitled "DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS", the '766 Application discloses "The volume percent of the  $\text{Al}_2\text{O}_3$  nano-scale phase,  $N_T$ , and the total volume percent of the modulus phase,  $V_M$ , in a three-phase nanocomposite are predetermined according to the strength and modulus requirement to be met as well as the aluminum matrix alloy type" (Page 5, Lines 22-25), and "The volume percent of nano phase  $\text{Al}_2\text{O}_3$ ,  $N_{Al}$ , needed in the aluminum powder can be calculated by Equation [1]:  $N_{Al} = N_T(1 + V_M/V_{Al})$ " (Page 5, Lines 26-28, Page 6, Line 1). The Applicants must point out that  $V_{Al}$  refers to the total volume percent of the aluminum phase although it was not specifically disclosed in the '766 Application. However, one having ordinary skill in metallurgy will clearly understand the physical meaning of the term  $V_{Al}$ . For this reason, the Applicants respectfully request the Examiner to accept the physical meaning of the term  $V_{Al}$  which is added through the present amendment. Therefore the step "b" of the independent Claim 1 has been amended, as set forth above.

In terms of the contents in the step "a" of the amended independent Claim 1, the Applicants believe that they are allowable since the amendment follows the disclosure of the '766 Application. They are copied from a step. a and c of the previously amended independent Claim 1 which was submitted through the last "PRELIMINARY AMENDMENT ACCOMPANYING REQUEST FOR CONTINUED EXAMINATION (RCE) dated April 28, 2006, wherein the Applicants provide an explanation as to where in the disclosure of the '766 Application support for the changes could be found, which explanation is specifically listed on Page 10. The Applicants incorporate these previous arguments by references.

5.2 Additional new dependent Claims 10 and 11 read as follows:

- "10. Said nanocomposite in accordance with Claim 1, wherein said aluminum or aluminum alloy particles with nano-scale surface aluminum oxide are comprised of an aluminum metal or aluminum

alloy inside of said particles and an aluminum oxide layer on the outside of said particles and are preferably in a spherical shape.

11. Said preferred spherical shaped aluminum or aluminum alloy particles with nano-scale surface aluminum oxide in accordance of Claim 10, wherein said aluminum oxide layer of the spherical particle can be quantitatively controlled from a volume percent of nano phase aluminum oxide needed in said particles which is defined by the symbol  $N_{Al}$  and is specified by:

$$N_{Al} = 1 - (1 - 2 T/D)^3$$

where T is a thickness of the aluminum oxide layer, and D is an average size of said particles”.

The Applicants believe that the newly added Claims 10 and 11 are allowable since they are supported by the disclosure of the ‘766 Application.

In the Section entitled “DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS”, the ‘766 Application discloses “The total volume percent of a nano-scale  $Al_2O_3$  on a spherical shaped aluminum powder, the size of average aluminum powder particle size D and the thickness of the nano-scale layer have a relationship defined by Equation [2]:  $N_{Al} = 1 - (1 - 2 T/D)^3$ ” (Page 7, Lines 3-8), wherein the disclosure “thickness of the nano- scale layer” refers to the term “T”.

5.3 Additional new dependent Claims 12 and 13 read as follows:

- “12. Said nanocomposite in accordance with Claim 1, further comprising an aluminum alloy phase, wherein said phase is formed during a consolidation step and a subsequent metal working step from aluminum or aluminum alloy particles with nano-scale surface aluminum oxide comprised of an aluminum metal or aluminum alloy

inside of said particles and an aluminum oxide layer on the outside of said particles.

13. Said nanocomposite in accordance with Claim 1, further comprising a nano-scale aluminum oxide phase comprising nano-scale aluminum oxide particles in said nanocomposite, said nano-scale aluminum oxide particles are prepared from the aluminum or aluminum alloy particles with nano-scale surface aluminum oxide comprised of an aluminum metal or aluminum alloy inside of said aluminum or aluminum alloy particles and an aluminum oxide layer on the outside of said aluminum or aluminum alloy particles, said nano-scale aluminum oxide phase is from said aluminum or aluminum alloy particles wherein said outside layer of aluminum oxides of said aluminum or aluminum alloy particles is broken in the processes of making said composite, wherein said breaking of said aluminum oxide layer of said aluminum or aluminum alloy particles does not happen in a step to make the powder mixture of said composite, and said breaking of said aluminum oxide layer happens during a consolidation step and subsequent metal working step, further an amount of said nano-scale aluminum oxide phase in said composite is quantitatively controllable in a step of making said aluminum or aluminum alloy particles with nano-scale surface aluminum oxide, and a modulus phase”.

In terms of the newly added dependent Claims 12 and 13, the Applicants believe that they are allowable since the contents of the claims are based on the disclosure of the '766 Application. Claims 12 and 13 are copied from a respective step. a and b of the previously amended independent Claim 1, which were submitted through the

1 last "PRELIMINARY AMENDMENT ACCOMPANYING REQUEST FOR  
2 CONTINUED EXAMINATION (RCE) dated April 28, 2006. In that document Pages 8  
3 to 10, the Applicants provide an explanation as to where the disclosure is in the '766  
4 Application, which corresponds with the claimed contents. Applicants incorporate these  
5 arguments by references herein.

6  
7 6. Analysis as to why the claims of the '766 Application through the  
8 present Amendment are allowable.

9  
10 The Applicants will now explain the patentability of the '766 Application. The  
11 explanation will first discuss some court findings on interpretation of the term  
12 "anticipation" under 35 U.S.C. § 102 as follows:

13  
14 The case of *Shatterproof Galss Corp. v. Libbny-Owens Ford Co.* 225 USPQ  
15 635, 644 states "*If one prior art reference completely embodies the same process or*  
16 *product as any claim of the patent in suit, the process or product recited by the claim is*  
17 *said to be 'anticipated' by the prior art, and the claim is therefore invalid under 102 for*  
18 *want of novelty*" ( Page 637, the First Column).

19 The case of *Scripps Clinic v. Genentech Inc.*, 18 USPQ2d, 1001, 1016  
20 states: "*Invalidity for anticipation requests that all of the element and limitation of the*  
21 *claim are found with a single prior art reference*", and "*there must be no difference*  
22 *between the claimed invention and reference disclosure, as viewed by a person of*  
23 *ordinary skill in the field of invention*" (Page 1010, the First column)

24 The case of *Connell v. Sears Roeback & Co*, 220 USPQ 193, 204 states  
25 "*In deciding the issue of anticipation, the trier of fact must identify the elements of the*  
26 *claims, determine their meaning in light of the specification and prosecution history and*  
27 *identify corresponding elements disclosed in the allegedly anticipating reference*".

28 The case of *In re King*, 231 USPQ 136 states "*Under the principles of*

1 *inherency, if a structure in the prior art necessarily functions in accordance with the*  
2 *limitations of a process or method claim of an application, the claim is anticipated. This*  
3 *is not to say that the discovery of a new use for an old structure based on unknown*  
4 *properties of the structure might not be patentable to the discovery as process”(P. 138,*  
5 *the First Column).*

6  
7 6.1 Following the court finding on the case *In re Sporck* that  
8 *“limitation from the specification are not read into the claims for the purpose of avoiding*  
9 *the art”,* 155 USPQ 687, the Applicants provide the following Table 1 to compare the  
10 claimed elements of the ‘766 Application with those of the Meeks Patent.

11  
12 After examining the claimed structural elements listed in the table,  
13 it is absolutely clear that first the Meeks Patent in the claim mainly discloses a process  
14 method, which is substantially different from the claimed product in the ‘766 Application.  
15 The independent Claim 1 as currently amended is particularly emphasized to the initially  
16 presented aluminum or aluminum alloy particles with nano-scale surface aluminum oxide  
17 comprised of an aluminum metal or aluminum alloy inside of said particles and an  
18 aluminum oxide layer on the outside of said particles. Thus, based on the following court  
19 finding, which is used as the guideline for interpretation of the “anticipation”, that “*If one*  
20 *prior art reference completely embodies the same process or product as any claim of the*  
21 *patent in suit, the process or product recited by the claim is said to be ‘anticipated’ by the*  
22 *prior art, and the claim is therefore in valid under 102 for want of novelty”, Shatterproof*  
23 *Galss Corp. v. Libbny-Owens Ford Co.* 225 USPQ 635, 644 states ( Page 637, the First  
24 Column), the Examiner’s rejection of the ‘766 Application under 35 U.S.C. § 102 is  
25 incorrect.  
26  
27  
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Table 1. Comparing differences in the claimed elements between the Meeks Patent and the '766 Application

The Meeks Patent	The '766 Application
<p><u>Claim</u> "1. The method of consolidating metal powder consisting...silicon carbide encapsulated within aluminum metal coatings, to form an object, that includes:</p> <p>a) pressing said powder into a preform ...</p> <p>b) providing a bed of flowable and heated pressure transmitting particles,</p> <p>c) positioning the preform in such relation to the bed that the particles encompass the preform</p> <p>d) and pressurizing said bed to compress said particles..., thereby to consolidate the preform into a desired object shape,</p> <p>e) said pressurizing being carried out to maintain or perserve formed nanocrystalline aluminum grain size,</p> <p>f) thereby to develop a substantially texture free microstructure at metallic grain boundaries.</p> <p><u>Claim</u> "2. ... wherein the aluminum metal coating has thickness of approximately 2-3 micros.</p> <p><u>Claim</u> "3. ..., wherein the aluminum coated particles develop an aluminum oxide coating.</p> <p><u>Claim</u> "4. ... wherein said pressurization is effected at levels greater than 80,000 psi..</p>	<p><u>Claim</u> "1. A nanocomposite which is manufactured from applying initial particles of materials, comprising: a. aluminum or aluminum alloy particles with nano-scale surface aluminum oxide comprised of an aluminum metal or aluminum alloy inside of said particles and an aluminum oxide layer on the outside of said particles, and particles of a modulus phase, and b. said aluminum oxide layer of the particles is quantitatively controlled from a volume percent of nano phase aluminum oxide needed in said particles which is defined by the symbol <math>N_{Al}</math>, and is specified by : <math>N_{Al} = N_T (1 + V_M/V_{Al})</math> where <math>N_T</math> is a volume percent of the nano phase aluminum oxide in the nanocomposite, <math>V_M</math> is a total volume percent of the modulus phase, and <math>V_{Al}</math> is a total volume percent of the aluminum phase in the nanocomposite".</p> <p>Claim "10. Said nanocomposite in accordance of Claim 1, wherein said aluminum or aluminum alloy particles with nano-scale surface aluminum oxide are comprised of an aluminum metal or aluminum alloy inside of said particles and an aluminum oxide layer on the outside of said particles and are preferably in a the spherical shape".</p> <p>Claim "11. Said preferred spherical shaped aluminum or aluminum alloy particles with nano-scale surface aluminum oxide in accordance of Claim 10, wherein said aluminum oxide layer of the spherical particles is quantitatively controlled from a volume percent of nano phase aluminum oxide needed in said particles, which is defined by the symbol <math>N_{Al}</math> and is specified by</p> $N_{Al} = 1 - (1 - 2 T/D)^3$ <p>where T is a thickness of the aluminum oxide layer, and D is an average size of said particles".</p>

The Meeks Patent discloses in Claim 3 to "develop an aluminum oxide coating", but the "aluminum oxide coating" is passively formed from its precursor "the aluminum metal coating" disclosed in Claim 2. It must also be pointed out that the claimed "aluminum coating" is coated onto each of silicon carbide particles in a CVD fluid bed reactor, which means the particle finally produced from the Meeks Patent has a core material of silicon carbide and an outer layer material of aluminum oxide. Therefore it can be concluded that the product particle of the Meeks Patent is substantially different from

1 the product particle of the '766 Application, which has "an aluminum metal or aluminum  
2 alloy inside of said particles and an aluminum oxide layer on the outside of said particles",  
3 and does not have silicon carbide inside of the particles. Thus, based on the following  
4 court finding, which is used as the guideline for interpretation of the "anticipation", that  
5 "*Invalidity for anticipation requests that all of the element and limitation of the claim are*  
6 *found with a single prior art reference*", and "*there must be no difference between the*  
7 *claimed invention and reference disclosure, as viewed by a person of ordinary skill in the*  
8 *field of invention*", *Scripps Clinic v. Genentech Inc.*, 18 USPQ2d, 1001, 1016 (Page 1010,  
9 the First column). the Examiner's rejection of the '766 Application under 35 U.S.C. § 102  
10 is incorrect.

11 It must be another pointed out that the produced particles from the Meeks  
12 Patent contains outer aluminum oxide layers, but they are passively formed. In contrast, the  
13 outer aluminum oxide layers are objectively and actively formed from '766 Application.  
14 Therefore a way which is the process to form the outer aluminum oxide layer is absolutely  
15 different between the Meeks Patent and '766 Application. Thus, based on the following  
16 court finding, which is used as the guideline for interpretation of the "anticipation", that "*In*  
17 *deciding the issue of anticipation, the trier of fact must identify the elements of the claims,*  
18 *determine their meaning in light of the specification and prosecution history and identify*  
19 *corresponding elements disclosed in the allegedly anticipating reference*", *Connell v. Sears*  
20 *Roebuck & Co*, 220 USPQ 193, 204, and "*Disclosure may serve as dictionary for terms in*  
21 *claims, in such instance, disclosure may be used by court in interpreting claims and in*  
22 *determining their scope*" *In re Barr, William, and Whitmore*, 170 USPQ 330, 340, the  
23 Examiner's rejection of the '766 Application under 35 U.S.C. § 102 is incorrect because  
24 the '766 Application has a substantially different scope of the invention than that of the  
25 Meeks Patent.

26 It is additionally pointed out that in the following invented Equation [1], the  
27 '766 Application can quantitatively control the total amount of the aluminum oxides on the  
28 initially presented particles to thereby control the aluminum oxide amount of the final

product nanocomposite as well, wherein the equation is now amended into step b. of the independent Claim 1. In contrast, the Meeks Patent does not have such quantitative capability. It is well known in science and engineering that the quantitative results are superior to the qualitative results. Therefore, based on the following court finding, which is used as the guideline for interpretation of the "anticipation", that "*Under the principles of inherency, if a structure in the prior art necessarily functions in accordance with the limitations of a process or method claim of an application, the claim is anticipated. This is not to say that the discovery of a new use for an old structure based on unknown properties of the structure might not be patentable to the discovery as process*", *In re King*, 231 USPQ 136 states (P. 138, the First Column), the Examiner's rejection of the '766 Application under 35 U.S.C. § 102' is incorrect.

In conclusion, the above analysis to summarize structural differences on issues of the product, process, claim scope and properties of the claimed invention between the Meeks Patent and '766 Application shows that the '766 is not anticipated by the Meeks Patent, wherein the analysis is followed by the court findings on each issue. The Applicants therefore respectfully believe that the currently amended independent Claim 1 of the '766 Application is patentable with regard to the claims of the Meeks Patent, and respectfully request the Examiner to grant allowance to Claim 1. Based on this reasoning, the Applicants respectfully request the Examiner to further grant allowance of all dependent Claims 2-13 since they are dependent upon the allowable Claim 1.

5.2 Following again the court finding on the case *In re Sporck* that "*limitation from the specification are not read into the claims for the purpose of avoiding the art*" 155 USPQ 687, the Applicants provide the following Table 2 to compare the claimed elements of the '766 Application with those of the Sawtell Patent.

After examining the claimed structural elements listed in the table, it is absolutely

clear that first the Sawtell Patent in the claim mainly discloses a process method, which is substantially different from the claimed product in the '766 Application.

Table 2. Comparing differences in the claimed elements between the Sawtell Patent and the '766 Application

The Sawtell Patent	The '766 Application
<p><u>Claim 1 series including 24, 26, 28 and 30</u> "1. A method ..., comprising:</p> <p>a) forming a blend by mixing a metal powder phase and at least one reinforcement phase ..., said metal powder having an oxide coating on its surface.</p> <p>b) cold pressing said blend to form a compact ...,</p> <p>c) heating said compact ... to form a preheated compact; and</p> <p>d) hot working said preheated compact to abrade said oxide coating on said metal powder and thereby increase the particle-to-particle bonding and provide a multi-phase worked product containing reinforcement material.</p> <p><u>Claim</u> "2. ... in which said metal is selected from ..." (various elemental metal).</p> <p><u>Claim</u> "3. ... in which said reinforcement phase is selected from ..." (various reinforcement phase materials).</p> <p><u>Claim</u> "4. ... in which said reinforcement phase is selected from ..." (various reinforcement phase materials with different physical shapes).</p> <p><u>Claim</u> "5. ... in which said reinforcement phase is selected from ..." (various reinforcement phase materials with different chemical compositions).</p>	<p><u>Claim</u> "1. A nanocomposite which is manufactured from applying initial particles of materials, comprising: a. aluminum or aluminum alloy particles with nano-scale surface aluminum oxide comprised of an aluminum metal or aluminum alloy inside of said particles and an aluminum oxide layer on the outside of said particles, and particles of a modulus phase, and</p> <p>b. said aluminum oxide layer of the particles is quantitatively controlled from a volume percent of nano phase aluminum oxide needed in said particles which is defined by the symbol <math>N_{Al}</math>, and is specified by: <math>N_{Al} = N_T (1 + V_M/V_{Al})</math> where <math>N_T</math> is a volume percent of the nano phase aluminum oxide in the nanocomposite, <math>V_M</math> is a total volume percent of the modulus phase, and <math>V_{Al}</math> is a total volume percent of the aluminum phase in the nanocomposite".</p> <p><u>Claim</u> "10. Said nanocomposite in accordance of Claim 1, wherein said aluminum or aluminum alloy particles with nano-scale surface aluminum oxide are comprised of an aluminum metal or aluminum alloy inside of said particles and an aluminum oxide layer on the outside of said particles and are spherical in shape".</p> <p><u>Claim</u> "11. Said preferred spherical shaped aluminum or aluminum alloy particles with nano-scale surface aluminum oxide in accordance of Claim 10, wherein said aluminum oxide layer of the spherical particles is quantitatively controlled from a volume percent of nano phase aluminum oxide needed in said particles, which is defined by the symbol <math>N_{Al}</math> and is specified by: <math>N_{Al} = 1 - (1 - 2 T/D)^3</math> where <math>T</math> is a thickness of the aluminum oxide layer, and <math>D</math> is an average size of said particles".</p> <p><u>Claim</u> "13. ... said nano-scale aluminum oxide phase is from said aluminum or aluminum alloy particles wherein said outside layer of aluminum oxides of said aluminum or aluminum alloy particles is broken in the processes of making said composite, wherein said breaking of said aluminum oxide layer of said aluminum or aluminum alloy particles does not happen in a step to make the powder mixture of said composite, and said breaking of said aluminum oxide layer happens during a consolidation step and subsequent metal working step.</p>

Independent Claim 1 as currently amended is particularly emphasized to the initially presented aluminum or aluminum alloy particles with nano-scale surface aluminum oxide

1 comprised of an aluminum metal or aluminum alloy inside of said particles and an  
2 aluminum oxide layer on the outside of said particles, wherein the total amount of the  
3 aluminum oxides can be objectively and quantitatively controlled.  
4

5 The Sawtell Patent in Claim 1 step. a discloses that "... said metal powder having an  
6 oxide coating on its surface" and in Claim 1 step. d discloses that "hot working said  
7 preheated compact to abrade said oxide coating on said metal powder", it is clear that the  
8 aluminum oxides of the Sawtell Reference are naturally presented as part of the particle  
9 structure before the particles are used in manufacturing. Therefore a process to have the  
10 aluminum oxides from the Sawtell Patent is significantly different from the process to  
11 objectively and quantitatively control the total amount of the aluminum oxides from the  
12 '766 Application. Thus, based on the following court finding, which is used as the  
13 guideline for interpretation of "anticipation", that "*If one prior art reference completely  
14 embodies the same process or product as any claim of the patent in suit, the process or  
15 product recited by the claim is said to be 'anticipated' by the prior art, and the claim is  
16 therefore in valid under 102 for want of novelty*", *Shatterproof Galss Corp. v. Libbny-  
17 Owens Ford Co.* 225 USPQ 635, 644 ( Page 637, the First Column), and "*Invalidity for  
18 anticipation requests that all of the element and limitation of the claim are found with a  
19 single prior art reference*", and "*there must be no difference between the claimed invention  
20 and reference disclosure, as viewed by a person of ordinary skill in the field of invention*",  
21 *Scripps Clinic v. Genentech Inc.*, 18 USPQ2d, 1001, 1016 (Page 1010, the First column),  
22 the Examiner's rejection of the '766 Application under 35 U.S.C. § 102 is incorrect,  
23 because the rejection fails to meet the tests of the "same product and the process" and "as  
24 viewed by a person of ordinary skill in the field of invention".  
25

26 Thus, based on the following court finding, which is used as the guideline for  
27 interpretation of the "anticipation", that "*In deciding the issue of anticipation, the trrer of  
28 fact must identify the elements of the claims, determine their meaning in light of the*

1 *specification and prosecution history and identify corresponding elements disclosed in the*  
2 *allegedly anticipating reference*", Connell v. Sears Roeback & Co, 220 USPQ 193, 204,  
3 and "*Disclosure may serve as dictionary for terms in claims, in such instance, disclosure*  
4 *may be used by court in interpreting claims and in determining their scope*" *In re Barr,*  
5 *William, and Whitmore*, 170 USPQ 330, 340, it is absolutely clear that the scope of the  
6 Sawtell Patent is "The present methods are particularly adapted for use with aluminum and  
7 aluminum wrought products and their manufacture involving the powdered starting  
8 materials" (Col. 1, Lines 14-17). With regard to the discovery of presence of the aluminum  
9 oxides, the Sawtell Patent clearly states " ...the oxide film on aluminum alloy... inhibits the  
10 particle-to-particle bonding necessary to form structural products" (Col. 5, Lines 38-42).  
11 "The abrasion destroys the oxide film during hot working and is believed to produce the  
12 unexpected products formed from powder alloy blend having sufficient mechanical  
13 performance in material ..." (Col. 5, Lines 42-45). The statements of "inhibits the particle-  
14 to-particle bonding necessary to form structural products" and "unexpected products"  
15 prove that formation of the aluminum oxides is not from the invention scope of the Sawtell  
16 Patent. In contrast, the '766 Application firmly states "The nano phase (nano-scale  
17 aluminum oxide particles) is to enhance nanocomposite strength" in Section of  
18 "SUMMARY OF THE INVENTION" (Page 3, Line 11 and (9)). Therefore the above  
19 analysis illustrates that the Examiner's rejection of the '766 Application under 35 U.S.C. §  
20 102 is incorrect because the '766 Application has a substantially different scope of the  
21 invention from that of the Sawtell Patent.

22  
23 It is additionally pointed out that following an invented Equation [1], the  
24 '766 Application can quantitatively control the total amount of the aluminum oxides on the  
25 initially presented particles to thereby control the aluminum oxide amount of the final  
26 product nanocomposite as well, wherein the equation is now amended into step b. of the  
27 independent Claim 1. In contrast, the Sawtell Patent does not have such quantitative  
28 capability. It is well known in science and engineering that the quantitative results are

superior to the qualitative results. Therefore, based on the following court finding, which is used as the guideline for interpretation of the "anticipation", that "*Under the principles of inherency, if a structure in the prior art necessarily functions in accordance with the limitations of a process or method claim of an application, the claim is anticipated. This is not to say that the discovery of a new use for an old structure based on unknown properties of the structure might not be patentable to the discovery as process*", *In re King*, 231 USPQ 136 (P. 138, the First Column), the Examiner's rejection of the '766 Application under 35 U.S.C. § 102 is incorrect.

In conclusion, the above analysis to summarize structural differences on issues of the product, process, claim scope and properties of the claimed invention between the Sawtell Patent and '766 Application shows that the '766 Application is not anticipated by the Sawtell Patent, wherein the analysis is followed by the court findings on each issue. The Applicants therefore respectfully believe that the currently amended independent Claim 1 of the '766 Application is patentable with regard to the claims of the Sawtell Patent, and respectfully request the Examiner to grant allowance to the independent Claim 1. For this reason, the Applicants respectfully request the Examiner to further grant allowance of all dependent Claims 2-13 since they are dependent upon the allowable Claim 1.

6. Regarding the Examiner's rejection of Claims 6 and 9 of the '766 Application under 35 U.S.C. § 103 (a), the Applicants provide following arguments.

The Supreme Court of the United States in the case of *Graham v. John Deere Co.*, 148 USPQ 459 provides the following guidelines for determining obviousness under 35 U.S.C. § 103(a):

1. Determining the scope and contents of the prior art.
2. Ascertaining the difference between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

- 1                   4.       Considering objective evidence present in the application indicating  
2                   obviousness or nonobviousness.

3       Following the above guidelines, the Applicants provide a comparison analysis on the issues  
4       of the each category suggested by the Supreme Court.

5  
6                   6.1       Regarding the Examiner's rejection of Claim 6

7                   The Examiner has rejected Claim 6 as being obvious based on the  
8       Bomford Patent combined with the Meeks or Sawtell Patent. The Applicants have  
9       provided very detailed analysis in Sections 5.1 and 5.2 to explain why the respective  
10      Meeks and Sawtell Patent do not anticipate the '766 Application, especially to the currently  
11      amended independent Claim 1, and have also provided reasons why all the dependent  
12      claims 2-13 of the '766 Application are allowable. Therefore those reasons will not be  
13      repeated here again.

14                  With regard to the reason from the combination which the Meeks  
15      Patent or Sawtell Patent is combined with the Bomford Patent for rejection of Claim 6, the  
16      Applicants will first compare the scopes and contents of the prior art Meeks Patent, Sawtell  
17      Patent and Bomford Patent with those of the '766 Application wherein the scopes and  
18      contents are listed in Table 3 as follows:

19                  Following the guideline of the Supreme Court "*Ascertaining the*  
20      *difference between the prior art and the claims at issue*", the Applicants must point out  
21      that the '766 Application is substantially different in comparison with the Sawtell and  
22      Bomford Patent which are combined together. Such difference in the aluminum oxide  
23      phase which is mainly in three folds, in which the '766 Application has the following  
24      distinguishable advantages : a) the aluminum oxide phase is *in situ* formed in metal  
25      working process, b) it is objectively formed, and c) it is quantitatively formed, wherein its  
26      amount is controllable.



Table 3. Comparing differences in scope and content among the Bomford Patent, Sawtell Patent, Meeks Patent and the '766 Application

The Bomford Patent	<p>Scope: Making sintered aluminum product applying composite powder consisting of aluminum particles and aluminum oxide particles.</p> <p>Key contents in claims: Claim "1. A mechanically alloyed composite powder consisting essentially of aluminum and aluminum oxide, individual particles thereof comprising a matrix of said aluminum and dispersoid particles of said aluminum oxide distributed substantially uniformly throughout said matrix, said dispersoid particles being substantially equiaxed and substantially all of said substantially equiaxed dispersoid particles being smaller than about 2,000 A".</p>
The Sawtell Patent	<p>Scope: The present methods are particularly adapted for use with aluminum and aluminum wrought products and their manufacture involving the powdered starting materials, wherein the aluminum oxides are naturally presented as an outer layer of the aluminum particles.</p> <p>Key contents in claims: Claim "1 series including 24, 26, 28 and 30 "1. A method ..., comprising: a) forming a blend by mixing a metal powder phase and at least one reinforcement phase ..., said metal powder having an oxide coating on its surface. b) cold pressing said blend to form a compact ..., c) heating said compact ... to form a preheated compact; and d) hot working said preheated compact to abrade said oxide coating on said metal powder and thereby increase the particle-to-particle bonding and provide a multi-phase worked product containing reinforcement material.</p>
The Meeks Patent	<p>Scope: Producing aluminum coated silicon carbide particles and making composite from the aluminum coated silicon carbide.</p> <p>Key contents in claims: Claim "1. The method of consolidating metal powder consisting ... silicon carbide encapsulated within aluminum metal coatings, to form an object, that includes: Claim 2. ... wherein the aluminum metal coating has thickness of approximately 2-3 micros.</p>
The '766 Application	<p>Scope: Applying the nano phase (nano-scale aluminum oxide particles) which is to enhance nanocomposite strength wherein the nano phase of the aluminum oxides is in situ formed and the amount of the phase is objectively and quantitatively controlled.</p> <p>Key contents in claims: a) said aluminum oxide layer of the particles is quantitatively controlled from a volume percent of nano phase aluminum oxide needed in said particles through following Equation [1]:  <math display="block">N_{Al} = N_T(1 + V_M/V_{Al}),</math> (from Claim 1)  b) wherein aluminum oxide layer of the spherical particles is quantitatively controlled from a volume percent of nano phase aluminum oxide needed in said particles through following Equation [2]:  <math display="block">N_{Al} = 1 - (1 - 2 T/D)^3 \text{ (from Claim 11)}</math> </p>

1 The Examiner states that because the Bomford Patent discloses "up to 10% by weight of  
2 aluminum oxide can be included in the aluminum or aluminum alloy product", and argues  
3 that the disclosed percentage is similar to the amount claimed in Claim 6 of the '766  
4 Application. However, it is clear that the nature and structure of the aluminum oxide phase  
5 of the '766 Application are absolutely different. In addition to these differences, a  
6 combination of the Bomford and Sawtell Patent or a combination of the Bomford and  
7 Meeks Patent cannot conduct the same results as the '766 Application claimed since (1) the  
8 Bomford Patent is not able to quantitatively determine the amount of the aluminum oxide,  
9 (2) the aluminum oxide phase of the Meeks Patents is formed by coating silicon carbide, (3)  
10 the Sawtell Patent treats the aluminum oxide film as a harmful material to the final product,  
11 and (4) the '766 Application quantitatively designs and processes the aluminum oxide as the  
12 strength enhancement.

13 Based on above analysis which follows the guidelines of the Supreme Court of the  
14 United States, the Applicants believe that Claim 6 is nonobvious over the Sawtell in view of  
15 the Bomford Patent, and thus respectfully request the Examiner to grant allowance.

16 6.2 Regarding the Examiner's rejection of Claim 9

17 The Examiner has rejected Claim 9 as being obvious over the  
18 combination of the Sawtell Patent combined with the Meeks Patent. The Applicants have  
19 provided very detailed analysis in Section 5.1 and 5.2 of the present Amendment to explain  
20 why the respective Meeks and Sawtell Patent are invalid to make the '766 Application being  
21 anticipated, especially to the currently amended independent Claim 1 of the '766  
22 Application, and have also provided reasons why all the dependent claims 2-13 of the '766  
23 Application are allowable. Therefore it is reasonable to conclude that the combination of  
24 two patents still cannot make the '766 Application obvious. In addition, if an analysis is  
25 performed following the above mentioned guidelines of the Supreme Court, the same  
26 conclusion of nonobviousness can also be reached. Therefore, the Applicants respectfully  
27 request the Examiner to grant allowance to Claim 9 of the '766 Application.  
28

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7. Therefore, with the claims of invention as now amended, it is respectfully submitted that the present '766 Application is now in condition for allowance and issuance of a Notice of Allowance of the '766 Application is respectfully solicited.

Date: Dec 19, 2006

Respectfully submitted,

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